

## CLAIMS

What is claimed is:

1. A tape drive system, comprising:

a head assembly, comprising:

    a head element for reading or writing data to a magnetic tape medium;

and

    a pressure sensor coupled to the head element, the pressure sensor configured to generate a pressure signal representative of a pressure applied by the head element onto the pressure sensor.

2. The tape drive system of claim 1, further comprising:

a head support, wherein the pressure sensor is coupled to the head support.

3. The tape drive system of claim 1, wherein the head assembly further comprises:

    an accelerometer for sensing an acceleration of the head assembly and for generating a acceleration signal representative of an acceleration experienced by the head assembly.

4. The tape drive system of claim 1, wherein the pressure sensor comprises a plurality of pressure sensing elements.

5. The tape drive system of claim 4, wherein the plurality of pressure sensing elements are positioned to sense a pressure gradient across the head assembly in a lateral direction perpendicular to a direction of tape travel.

6. The tape drive system of claim 1, further comprising:

a take-up reel motor;

a supply reel motor;

a motor controller coupled to the take-up reel motor, the supply reel motor, and the pressure sensor, the motor controller being configured to control the rotation of the take-up reel motor and the supply reel motor in response to changes in the pressure signal to maintain a desired tension in a tape medium passing between a take-up reel coupled to the take-up reel motor and a supply reel coupled to the supply reel motor.

7. The tape drive system of claim 6, further comprising:
  - an accelerometer for sensing an acceleration of the head assembly and for generating a acceleration signal representative of an acceleration experienced by the head assembly; and
  - a tension control module coupled to the pressure sensor and the accelerometer for receiving the pressure signal and the acceleration signal and generating a tension signal representative of a tension in the tape medium;
  - wherein the motor controller is coupled to the pressure sensor through the tension control module such that the motor controller controls the rotation of the take-up reel motor and the supply reel motor based upon the tension signal generated by the tension control module.
8. The tape drive system of claim 2, wherein:
  - the head support further comprises a guide member receiving portion; and
  - the head element further comprises:
    - a front side for contacting the magnetic tape medium;
    - a back side opposite the front side; and
    - a guide member protruding from the back side of the head element and having a distal end movably positioned in the guide member receiving portion of the head support, such that the head element is movable along an axis defined by the guide member.
9. The tape drive system of claim 8, wherein:

the head element further comprises a rotation inhibiting member which engages the head support to prevent the head element from rotating about the axis defined by the guide member while enabling the head element to move along the axis defined by the guide member.

10. The tape drive system of claim 8, wherein:

the pressure sensor is disposed between the head support and the back side of head element.

11. The tape drive system of claim 10, wherein:

the pressure sensor comprises a first pressure sensing element and a second pressure sensing element, the guide member being positioned between the first and second pressure sensing elements.

12. A method of operating a tape drive system, comprising:

passing a tape medium between a take-up reel and a supply reel such that a tension in the tape medium causes the tape medium to apply a pressure onto a head element; and

using a pressure sensor to detect a pressure applied by the head element onto the pressure sensor.

13. The method of claim 12, further comprising:

determining whether the pressure detected by the pressure sensor corresponds to a desired tape medium tension; and

if the pressure detected by the pressure sensor corresponds with an undesired tape medium tension, adjusting the tension of the tape medium.

14. The method of claim 13, wherein the adjusting the tension of the tape medium comprises adjusting a rotational velocity of a take-up reel motor driving the take-up reel or a supply reel motor driving the supply reel.

15. The method of claim 12, further comprising:  
using a accelerometer to detect an acceleration of a head support, the head  
element being supported by the head support;  
wherein the determining whether the pressure detected by the pressure sensor  
corresponds with the desired tape medium tension comprises calculating a tension in the  
tape medium based upon the pressure detected by the pressure sensor and acceleration  
of the head support detected by the accelerometer.

16. A tape drive system, comprising:  
a take-up reel motor;  
a supply reel motor;  
a tape path for a magnetic tape medium; and  
a pressure sensing assembly provided adjacent the tape path, the pressure  
sensing assembly comprising:  
a support;  
a tape contacting member; and  
a pressure sensor coupled to the tape contacting member, the pressure  
sensor configured to generate a pressure signal in response to a compression of  
the pressure sensor, the signal being representative of a pressure applied by the  
magnetic tape medium onto the pressure sensing assembly.

17. The tape drive system of claim 16, wherein the pressure sensor is further  
coupled to the support.

18. The tape drive system of claim 16, wherein the pressure sensor  
comprises one or more pressure sensing elements, each pressure sensing element  
comprising a transducer for producing the signal representative of the pressure applied  
by the magnetic tape medium onto the pressure sensing assembly.

19. The tape drive system of claim 16, further comprising:  
a motor controller coupled to the take-up reel motor, the supply reel motor, and  
the pressure sensing assembly, the motor controller being configured to control the  
rotation of the take-up reel motor and the supply reel motor in response to changes in  
the pressure signal to maintain a desired tension in a tape medium passing between a  
take-up reel coupled to the take-up reel motor and a supply reel coupled to the supply  
reel motor.

20. The tape drive system of claim 16, wherein:  
the pressure sensing assembly comprises a head assembly;  
the tape contacting member comprises a head element; and  
the support comprises a head support.

21. The tape drive system of claim 16, wherein:  
the pressure sensing assembly comprises a head assembly;  
the tape contacting member comprises a head element; and  
the support comprises a head support.

22. The tape drive system of claim 16, wherein:  
the pressure sensing assembly comprises a assembly;  
the tape contacting member comprises a head element; and  
the support comprises a head support.